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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,111	06/30/2003	Takahisa Kato	03500.017366	1040

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EXAMINER
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RICHARDS, N DREW

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/608,111		KATO ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	N. Drew Richards		2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 September 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 12 and 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8-11 is/are rejected.
- 7) ☒ Claim(s) 6 and 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/12/03, 2/4/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group I, claims 1-11, in the reply filed on 9/13/04 is acknowledged. The traversal is on the ground(s) that the amount of effort required by the U.S. Patent and Trademark Office would be lessened by permitting all of the claims in the present application to be prosecuted in a single application as opposed to the effort of prosecuting a second application. This is not found persuasive because whether the Patent Office has to examine a second application has no bearing on the burden required to examine the present application. In the present application, a serious burden would result in the examination of the two distinct inventions claimed.

The requirement is still deemed proper and is therefore made FINAL.

### ***Drawings***

2. Figures 14, 15 and 16 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3 and 9-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Bessho et al. (U.S. Patent No. 5,982,521).

Bessho et al. disclose a microstructure in figures 1-37 and on columns 1-28.

Specifically, Bessho et al. disclose:

a microstructure 200 comprising a support substrate 1 and a movable plate 3, in which the movable plate 3 is supported by an elastic support portion 5 so that the movable plate can be freely torsion-vibrated to the support substrate 1 about a torsion axis (figure 2, column 4 lines 16-25); wherein

the elastic support portion 5 has at least one concave portion 54d (figure 31, the concave portion is considered to be the portion labeled 53d that includes the outer edges of portions 54a and 54c such that 54d is concave as shown; figure 31 is an example of the sixth embodiment of their invention, column 20 lines 59-61, the spring 5 of figure 31 is disclosed as being used in the apparatus as shown in figure 2 on column

Art Unit: 2815

21 lines 44-46, thus the spring 5 of figure 31 is disclosed as being part of the optical apparatus of figure 2),

at both ends of a first section 54d in which the concave portion is formed, a second section 54a/54c in which the concave portion is not formed is arranged (figure 31); and

the second section 54a/54c connects with the movable plate 3 and the support substrate 1 (column 22 lines 22-35).

With regard to claim 2, a length of the first section 54d is not shorter than a half of the entire length of the elastic support portion 5 in length in the torsion-axis direction (as seen in figure 31).

With regard to claim 3, the first section 54d has a third section in which a depth of the concave portion increases as approaching to the center of the first section along the torsion-axis direction, and wherein the third section connects with the second section (see figure 31, the third section is considered the portion along the ends of the first section where the spring 5 becomes thin, the depth is considered the curved portion such that it increases towards a center of 54d).

With regard to claim 9, Bessho et al. disclose a micro optical deflector 100 comprising the microstructure 200 of claim 1, driving means 7 for relatively driving the support substrate 1 and the movable plate 3, and a reflection plane 3m formed on the movable plate 3 to reflect light 10 (figure 2, column 4 line 16 through column 5 line 48).

With regard to claim 10, the micro optical deflector of figure 2 is considered to be an optical apparatus.

Art Unit: 2815

With regard to claim 11, figure 2 is also considered to be an image display apparatus. Figure 2 comprises a light source 11 and a micro optical deflector 200 in which at least one micro optical deflector of claim 9 for deflecting the light 10 emitted from the light source 11 is set, wherein at least a part of the light deflected by the micro optical deflector is projected onto an image display body 12. Structure 12 is considered to be an "image display body" as it is a body that has the image from the light source 11 displayed thereon.

5. Claims 1, 2 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Ives (U.S. Patent No. 6,632,698 B2).

Ives discloses a microstructure in figures 1-16 and on columns 1-14.

Specifically, Ives discloses:

a microstructure 110 comprising a support substrate 116 and a movable plate 112, in which the movable plate 112 is supported by an elastic support portion 120 so that the movable plate 112 can be freely torsion-vibrated to the support substrate 116 about a torsion axis (figure 6, column 7 line 66 through column 8 line 34); wherein

the elastic support portion 120 has at least one concave portion (figure 6, three voids are shown in elastic support 120, the central unlabeled void is considered the concave portion, note that a void or whole is considered concave);

at both ends of a first section in which the concave portion is formed, a second section is which the concave portion is not formed is arranged (figure 6), and

Art Unit: 2815

the second section connects with the movable plate 112 and the support substrate 116 (figure 6).

The second section is considered the distal portions of elastic support 120, which connects to the substrate 116 and the plate 112. The second section does not have "the concave" portion arranged therein as "the concave" portion is considered only the central void of figure 6.

With regard to claim 2, the movable plate 112 of figure 6 is disclosed as being movable in the "Y" direction (column 8 lines 14-23). As such, a length of the first section is not shorter than a half of the entire length of the elastic support portion 120 in length in the torsion-axis direction (figure 6, the first section has a length equal to the length of the elastic support portion 120 in the "Y" direction).

With regard to claim 8, Ives further disclose in figures 8 and 10 that the first section has a V- or X-shaped cross section in a plane vertical to the torsion axis.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ives as applied to claims 1, 2 and 8 above, and further in view of Shaw et al. (U.S. Patent No. 6,051,866).

Art Unit: 2815

Ives teach their support substrate 116, elastic support portion 120, movable plate 112 and concave portion being integrally formed (figure 6 shows all structures formed from one piece of material). Ives further teach that they are formed of polysilicon (column 6 lines 5-15). Ives does not teach the structures being formed of a single-crystal material as recited in claim 4. Nor does Ives teach the single-crystal material being single-crystal silicon as recited in claim 5.

Shaw et al. teach a microelectromechanical structure in figure 7, for example, including a support substrate 154, an elastic support portion 52, and a movable plate 150. Shaw et al. teach forming these structures integrally from single-crystal silicon (abstract).

Ives and Shaw et al. are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form the device of Ives integrally from single-crystal silicon. The motivation for doing so is that single-crystal silicon has a higher breaking strength and superior electrical properties (Shaw et al. column 1 lines 55-59). Therefore, it would have been obvious to combine Ives with Shaw et al. to obtain the invention of claims 4 and 5.

### ***Allowable Subject Matter***

8. Claims 6 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.



Art Unit: 2815

9. The following is a statement of reasons for the indication of allowable subject matter: Prior art of record fails to teach, disclose, or suggest, either alone or in combination, the device as claimed in claim 5 further including either:

- a. the elastic support portion being constituted by (100) and (111) equivalent planes of a silicon crystal plane; or
- b. the concave portion being constituted by (111) equivalent plane of a silicon crystal plane.

The prior art fails to teach any specific crystal planes or equivalent planes and no motivation could be found to form the structures along the specific planes claimed.

### ***Conclusion***

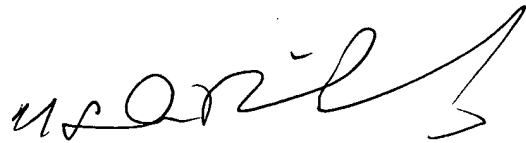
10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jerman (U.S. Patent No. 5,177,579), Yamamoto (U.S. Patent No. 5,231,879), Mutoh et al. (U.S. Patent No. 6,774,445 B2).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (571) 272-1736. The examiner can normally be reached on Monday-Friday 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2815

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "N. Drew Richards", with a stylized flourish at the end.

N. Drew Richards  
AU 2815